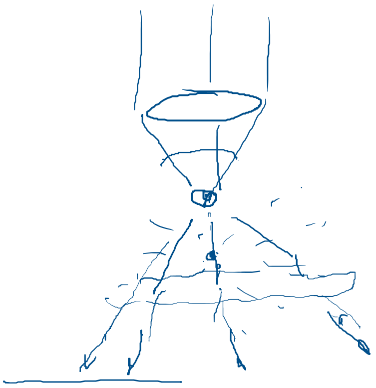
Erik 2024-05-10

Friday, May 10, 2024 4:59 PM



$\sim 1.22 \frac{\lambda}{N.A.}$

$\oint_L \vec{J}\, d\vec{x} = R$

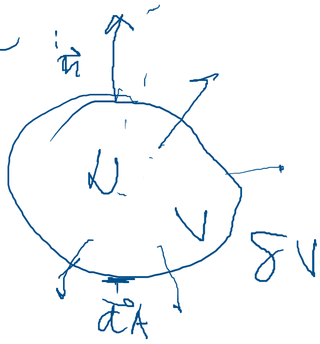
cirkulácia poľa v uzavretej krivke L

$\text{rot}\, \vec{J} = \lim_{V \to 0} \frac{\oint_L \vec{J}\, d\vec{l}}{V} = \vec{\nabla} \times \vec{J}$

$J_D = -D \,\text{grad}\, c$

Zákon zachovania

$\frac{dN}{dt} = -\oint_{\delta V}$



$\frac{d}{dt}\int c\, dV + \oint_A \vec{J} \cdot d\vec{A} =$

$\vec{n}\, dA$

normála

el. plochy

$c = c(x, y, z, t)$

$= \int_V \frac{\partial c}{\partial t}\, dV + \int_V \text{div}\, \vec{J}\, dV =$

pre ľub. objem

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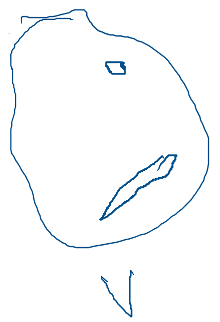
$$= \int_V dV \left(\frac{\partial c}{\partial t} + \operatorname{div} \vec{j} \right) = 0$$



$$\boxed{\frac{\partial c}{\partial t} + \operatorname{div} \vec{j} = 0}$$

$$\vec{j} = -D \operatorname{grad} c$$

$$\frac{\partial c}{\partial t} - D \underbrace{\operatorname{div} \operatorname{grad} c} = 0$$

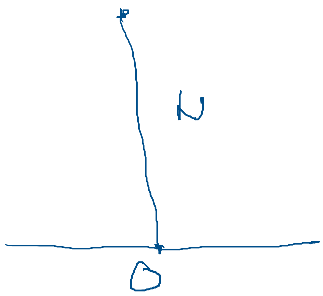
$$\nabla \cdot \nabla c = \Delta c$$

$$\frac{\partial^2 c}{\partial x^2} + \frac{\partial^2 c}{\partial y^2} + \frac{\partial^2 c}{\partial z^2}$$

$$\boxed{\frac{\partial c}{\partial t} = D \Delta c}$$

$$\mathcal{D} = (-\infty, \infty)$$

$$c_{t=0} = N\delta(x)$$



$$\frac{\partial c}{\partial t} = D \frac{\partial^2 c}{\partial x^2}$$

$$c(x,t) = C_0 e^{-\frac{x^2}{4Dt}}$$

E

$$\frac{\partial c}{\partial t} = C_0 E \cdot \left(-\frac{x^2}{4D} \right) \left(-\frac{1}{t^2} \right) =$$

$$\frac{\partial c}{\partial t} = C_0 E \cdot \left(-\frac{x^2}{4D}\right)\left(-\frac{1}{t^2}\right) =$$

$$= C_0 \frac{x^2}{4Dt^2} E$$

$$\frac{\partial c}{\partial x} = C_0 E \left(-\frac{1}{4Dt}\right)(2x)$$

$$\frac{\partial^2 c}{\partial x^2} = C_0 E \left(-\frac{1}{4Dt}\right)^2 (2x)^2$$

$$+ C_0 E \left(-\frac{1}{4Dt}\right) \cdot 2$$

$$= C_0 E \left[\left(\frac{x}{2Dt}\right)^2 - \frac{1}{2Dt} \right]$$

D. Ú.

$$\vec{E} = \frac{1}{4\pi\varepsilon} \frac{q}{r^3} \vec{r} \qquad U = \frac{1}{4\pi\varepsilon} \frac{q}{r}$$

$\mathrm{div}\, \vec{E}$?

$\mathrm{grad}\, U$?

ΔU